Version: Interim Final
2/5/99

ATTACHMENT 1
DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
RCRA Corrective Action
Environmental Indicator (EI) RCRIS Code (CA725)
Current Human Exposures Under Control

Facility Name: _____
Facility Address: _____
Facility EPA ID #: _____

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

    ____ If yes - check here and continue with #2 below,

    ____ If no - re-evaluate existing data, or

    ____ If data are not available skip to #6 and enter"IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be **"contaminated"** [4] above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

Media	Yes	No	?	Rationale/Key Contaminants
Groundwater				
Air (indoors)[5]				
Surface Soil (e.g., <2 ft)				
Surface Water				
Sediment				
Subsurface Soil (e.g., >2 ft)				
Air (outdoors)				

____ If no (for all media) - skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

____ If yes (for any media) - continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

____ If unknown (for any media) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):_____

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[4] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

[5] **Recent evidence (from the Colorado Dept. of Public Health and Enviro others) suggest that unacceptable indoor air concentrations are mo in structures above groundwater with volatile contaminants than pr believed. This is a rapidly developing field and reviewers are encourag the latest guidance for the appropriate methods and scale of demons necessary to be reasonably certain that indoor air (in structures loca (and adjacent to) groundwater with volatile contaminants) does not unacceptable risks**.

3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table Potential **Human Receptors** (Under Current Conditions)							
"Contaminated" Media	**Residents**	**Workers**	**Day-Care**	**Construction**	**Trespassers**	**Recreation**	**Food**[6]
Groundwater	Yes/No	Yes/No	Yes/No	Yes/No	N/L	N/L	Yes/No
Air (indoors)	Yes/No	Yes/No	Yes/No	N/L	N/L	N/L	N/L
Soil (surface, e.g., <2 ft)	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
Surface Water	Yes/No	Yes/No	N/L	N/L	Yes/No	Yes/No	Yes/No
Sediment	Yes/No	Yes/No	N/L	N/L	Yes/No	Yes/No	Yes/No
Soil (subsurface, e.g., >2 ft)	N/L	N/L	N/L	Yes/No	N/L	N/L	Yes/No
Air (outdoors)	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	N/L	N/L

Instructions for Summary Exposure Pathway Evaluation Table:

1. For Media which are not "contaminated" as identified in #2, please strike-out specific Media, including Human Receptors' spaces, or enter "N/C" for not contaminated.

2. Enter "yes" or "no" for potential "completeness" under each "Contaminated" Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations, some potential "Contaminated" Media - Human Receptor combinations (Pathways) are not assigned spaces in the above table (i.e, **N/L - not likely**). While these combinations may not be probable in most situations, they may be possible in some settings and **should be added as necessary**.

____ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major

[6] Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

pathways).

____ If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.

____ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code

Rationale and
Reference(s):____
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4 Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **"significant"**[7] (i.e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?

____ If no (exposures can not be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

____ If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

____ If unknown (for any complete pathway) - skip to #6 and enter "IN" status code

Rationale and
Reference(s):_____
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[7] If there is any question on whether the identified exposures are "significant" (i.e., potentially "unacceptable") consult a human health Risk Assessment specialist with appropriate education, training and experience.

5 Can the "significant" **exposures** (identified in #4) be shown to be within **acceptable** limits?

____ If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

____ If no (there are current exposures that can be reasonably expected to be "unacceptable")- continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.

____ If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code

Rationale and
Reference(s):_____
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6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

____ YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the _____ _____ facility, EPA ID #_____, located at _____ under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

____ NO - "Current Human Exposures" are NOT "Under Control."

____ IN - More information is needed to make a determination.

Completed by (signature) _____ Date _____
(print) _____
(title) _____

Supervisor (signature) _____ Date _____ [8]
(print) _____
(title) _____
(EPA Region or State) _____

Locations where References may be found:

_____
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_____
_____
_____

Contact telephone and e-mail numbers

(name)_____
(phone #)_____
(e-mail)_____

[8] **FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.**

Optional Exposure Pathway Evaluation Work Sheet
Referenced in CA725 - Question 3

Explanatory Footnotes:

Exposure Pathway Evaluation Work Sheet is a qualitative evaluation of the "completeness" of major pathways between contamination and exposures by plausible receptors. This screening only evaluates the major pathways (that are common at many/most contaminated site situations) and should not be used to reduce the scope of a site-specific risk assessment (which should include all pathways which may be significant at a given site).

Additional note: The following are special situations in which project managers should be cautious about using benchmark or other generic screening levels that have been derived with specific assumptions. In any of the situations, the risk manager should have a risk assessor provide assistance to review the use of the screening models.

1) The use of screening levels when multiple contaminants are present at a site; most guidances were developed for single contaminant exposures scenarios and are not appropriate to consider compounded or synergistic effects of multiple contaminants.

2) The use of screening levels when multiple routes of exposure are possible for given contaminant; some of the screening guidances consider multiple exposure routes but all of them do not.

3) The use of soil screening levels at sites with oily soils, free phase hydrocarbon on the groundwater, and free phase hydrocarbon below the water table; the guidances were developed assuming water leaching of soils not oil transport of contaminants through soils.

Optional Exposure Pathway Evaluation Work Sheet
Referenced in CA725 - Question 3

(1/5/99 Draft)

Screening Potentially Complete Pathways for Contaminated GROUNDWATER

Off-site GW Cont.	wells impacted? wells not "	Potable use Non-potable uses	Phyl/Inst. controls? (e.g., treatment @ wellhead?) Watering plants? Swimming pools? Showering??	Resident (ingestion) (inhalation) (dermal)
On-site GW Cont.	wells impacted? wells not "	Potable use Non-potable uses	Phyl/Inst. controls? (e.g., gw-use restrictions?) Process-water exposures? Watering landscaping? Showering??	Worker (M) (ingestion) (inhalation) (dermal)
On- or Off-site GW Cont.	const. into gw expected? " " not "		Phyl/Inst. controls? (e.g., PPE/Training req?)	Const. Work. (inhalation) (dermal cont.)
On- or Off-site GW	irrigation of veg./fruit expected? " veg../fruit not "		Phyl/Inst. controls? (e.g, testing/restrictions?)	Food Supply (Ingestion) Cont.

Screening Potentially Complete Pathways for Contaminated SURFACE SOIL

Off-site SS Cont.	contam. expected contam. not "	Private yards, etc. Not heavy use areas	Phyl/Inst. controls? (e.g., vegetation, etc.)	Resident Recreator (ingestion) (dermal cont.) (inhalation)
On-site SS Cont.	contam. expected contam. not "	High use/maint. areas? Not heavy use areas	Phyl/Inst. controls? (e.g., PPE/Fencing?) (Ok for children?)	Worker (M) Trespasser (ingestion) (inhalation) (dermal)
On- or Off-site cont. SS Cont.	construction expected? construct. not "		Phyl/Inst. controls? (e.g., PPE/Training req?)	Const. Work. (ingestion) (inhalation) (dermal cont.)
On- or Off-site SS Cont.	veg./fruit/game expected? veg./fruit/game not "		Phyl/Inst. controls? (e.g., Testing/Restrictions?)	Food Supply (Ingestion)

Screening Potentially Complete Pathways for Contaminated SURFACE WATER/SEDIMENT

Off-site SW/S Cont.	contam. expected? contam. not " " not expected	Water supply intakes?	Phyl/Inst. controls? (e.g., treated prior to)	Resident (ingestion) (inhalation) (dermal cont.)
Off-site SW/S Cont.	contam. expected? contam. not "	Private yards, etc. Not heavy use areas	Phyl/Inst. controls? (e.g., remoteness?) (children?)	Resident Recreator (ingestion) (inhalation) (dermal cont.)
On-site SW/S Cont.	contam. expected contam. not "	High use/maint. areas? Not heavy use areas	Phyl/Inst. controls? (e.g., fences/signs?) (children?)	Worker (M) Tresspassor (ingestion) (inhalation) (dermal cont.)
On- or Off-site SW/S Cont.	construct. expected? construct. not "		Phyl/Inst. controls? (e.g., PPE/training req?)	Const. Work. (ingestion) (inhalation) (dermal cont.)
On- or Off-site SW/S Cont.	fish/shellfish/veg./game expected? fish/shellfish/veg./game not "		Phyl/Inst. controls? (e.g., consumption restrictions?)	Food Supply (Ingestion)

Screening Potentially Complete Pathways for Contaminated SUB-SURFACE SOIL

On- or Off-site SubSoil Cont.	construction expected? construct. not "	Phyl/Inst. controls? (e.g., PPE/training req?)	Const. Work. (ingestion) (inhalation) (dermal cont.)
On- or Off-site SubSoil Cont.	deep rooted veg./fruit expected? " veg./fruit not "	Phyl/Inst. controls? (e.g., planting restrictions?)	Food Supply (ingestion)

Screening Potential Pathways for Contaminated INDOOR AIR

Contamination in groundwater, surface or subsurface soil, surface water, or sediments;

Adjacent to homes?	vapors/particulates likely?	Phyl/Inst. controls?	Resident
" not " "	no " "	(e.g., barriers/veg.)	(inhalation-indoors)
Adj. to workplace bldgs?	vapors/particulates likely?	Phyl/Inst. controls?	Worker
" not " "	no " "	(e.g., barriers/veg.)	(inhalation-indoors)

Outdoor Air - Addressed in Earlier Pathways

Examples of Exposure Controls

1. Physical Exposure Controls

Caps
Fences/walls
Security Guards
Vegetative Cover
Natural Inaccessibility
Remoteness/Unattractiveness
Treatment of media (prior to exposure)
Vapor barriers / ventilation systems

2. Institutional Exposure Controls

Posted Signs
Land-use Restrictions (e.g., zoning, deed, Responsible Party statements)
Level of PPE (Personal Protection Equipment)
Safety Training / Newsletters
Activity Permits / Notifications (e.g., construction permits / notifications)
Well Restrictions
Media-use Restrictions
Responsible Party statements of activity / use restrictions
Testing / Montitoring (and restrictions if necessary)
Consumption Restrictions
Restrictions on Frequency of Exposures